9:15

INTRACORONARY ULTRASOUND EVALUATION OF INTIMAL THICKENING IN CARDIAC TRANSPLANT RECIPIENTS: CORRELATION WITH CLINICAL CHARACTERISTICS

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Intracoronary ultrasound (ICU) enables *in vivo* evaluation of both lumen and vessel wall morphology. Accelerated coronary artery disease, initially manifested as intimal hyperplasia, is a serious complication of cardiac transplantation and underlying mechanisms for its development are not well understood. Previous reports from our institution showed that hypertriglyceridemia, hypercholesterolemia and number of rejection episodes had a weak association with the early angiographic appearance of graft atherosclerosis. We studied 21 cardiac transplant recipients (mean age: 44±14) three weeks to 13 years after transplantation, with a 5F, 30 MHz, intravascular ultrasound imaging catheter (CVIS Inc) and compared coronary intimal thickening detected by ICU with various clinical characteristics including donor's age, time of ischemia, time from transplant, number of rejection episodes, mean blood level of cholesterol (HDL and LDL) and glucose, HLA-mismatchings, and total dosage of steroids and imunossupressive therapy.
Results: An intimal layer was present in cardiac recipients more than one year after transplantation and a mean intimal thickness of 0.43±0.24 mm was measured by ICU in these patients. Multivariate analysis showed a statistically significant correlation with total amount of steroid therapy but with no other clinical characteristic.
Conclusion: ICU is a unique method for evaluating coronary disease in the transplant patients. The surprising finding of a significant correlation between ICU measured intimal proliferation and steroid therapy and not with number of rejection episodes suggests that severity and duration of rejection more than frequency may influence intimal proliferation. Long term follow up studies with ICU should help to improve our understanding of transplant coronary artery disease.

9:30

LACK OF DEMONSTRABLE EFFECT OF CYCLOSPORIN A ON EDRF RELEASE IN HUMAN CORONARY ARTERIES.

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Cyclosporin A (CsA) toxicity is thought to be mediated by impairment of endothelial mechanisms. Varying degrees of endothelial dysfunction have been reported in cardiac transplant recipients. We have examined the influence of CsA on human epicardial coronary arteries both in vitro and in vivo. 79 segments of human coronary artery obtained from 11 explanted hearts,were incubated for 3 hours in CsA (100ng/ml - 2000ng/ml disolved in methanol. Changes in tension were measured isometrically following vessel preconstriction and subsequent application of substance P (SP, 10^{-10}M - 10^{-7}M). Prior exposure to CsA at therapeutic concentrations did not affect the maximum relaxation induced by SP ($p>0.05$) (Control: 52.9±11.5%; 100ng/ml: 69.9±13.3%; 500ng/ml: 73±11.4%) compared to maximal dilation obtained with 1ug/ml glyceryl trinitrate. Following incubation with 1000ng/ml and 2000ng/ml CsA, the maximum relaxations measured were 63±11.5% and 62.2±11.1% respectively, representing a blunting of vasodilatory response as compared to control (76.6±7.4%); this was not significant ($p>0.05$). In addition, 15 vessel segments removed from 3 patients undergoing re-transplantation were also assessed for endothelial function as described above. These patients had been receiving immunosuppressive doses of CsA for a mean of 20 months. The maximum response to SP in these segments was 78±11.0%. The effect of intracoronary SP in 12 patients receiving CsA (blood level mean±SEM: 228.9±42.8 ng/ml) was also examined. The mean maximum dilation measured as % diameter change induced by SP and ISDN was 22.06±3.2% and 26.0±2.5% respectively; ($p>0.05$). There was no correlation between degree of endothelial mediated vasodilation to SP and CsA level. It is concluded that CsA in therapeutic or toxic doses does not appear to impair EDRF release.

9:45

CORONARY ANGIOPLASTY IN CARDIAC TRANSPLANT PATIENTS: RESULTS OF A MULTICENTER STUDY.

Austin Halle MD, Germano DiSciascio MD, Robert Wilson MD, Edward Massin MD, Maryl Johnson MD, Michael Stadius MD, Robert Wray MD, James Young MD, Ross Davies MD, Gary Walford MD, Ubeydullah Deligonul MD, Gustavo Rincon MD, Robert Bourge MD, Chauncey Crandall MD, Michael Cowley MD, George Vetrovec MD, Medical College of Virginia, Richmond, Virginia

To assess the acute and late outcomes of coronary angioplasty (PTCA) for coronary artery disease (CAD) in cardiac transplant (CT) recipients, the results of a multicenter, retrospective but consecutive and inclusive patient (pt) experience is presented. Thirty-five pts (age 48±2 years, mean±SEM) from 11 centers (range 1-14 pts) underwent 51 procedures for 95 lesions 53±5 mos post-CT. The primary indications for PTCA were angiographic CAD 22(43%) pts, non-invasive evidence of ischemia 18(35%) pts, ischemic symptoms 4(8%) pts and progressive CAD 4 (8%) pts. Angiographic success (≤50% stenosis) was 88/95 (93%) lesions. The mean pre-PTCA stenosis was 83±1.1%; the mean post-PTCA stenosis was 29±2.1% ($p<0.0001$). Complications of PTCA were 1 death, 1 myocardial infarction (MI), 3 hematomas, 1 renal insufficiency. At follow-up 23/35 (66%) pts are alive 13±3 mos post-PTCA. Major events <6 months post-PTCA were 4 deaths, 2 repeat CT, 9 repeat PTCA, 1 MI, 3 progressive CAD. Major events >6 mos were 4 deaths, 3 repeat CT (all later died), 7 repeat PTCA. Thus, in selected CT pts, PTCA has comparable success and complication rates as routine PTCA and may prolong allograft function. However, CAD progression may be rapid, requiring repeat PTCA or CT.

Tuesday, March 5, 1991
8:30AM- 10:00AM, Room 202, East Concourse
Advanced Imaging: Radiography and Computed Tomography

8:30

IN VIVO ESTIMATION OF MYOCARDIAL MASS PERFUSED BY SELECTED MAJOR CORONARY ARTERIES

Yun-He Liu, Robert C. Bahn, Erik L. Ritman, Mayo Medical School, Rochester, MN

The mass and location of ventricular myocardium at risk is an important determinant of size of myocardial infarction after coronary occlusion. Previous results ("Myocardial volume perfused by coronary artery branches - postmortem and 3-D x-ray CT analysis"; Y-H. Liu et al. J Lab Clin Med, October 1990) from isolated dog hearts showed that there is an exponential relationship between vessel lengths (Lmm) and their perfused areas (Amm^2) at the form $\log A = k \log L + c$ where $k \cong 10$ and $c \cong 1$.

In the present studies, one isolated dog heart and two isolated pig hearts with coronary arteries injected with Barium paste and an in vivo pig heart with aortic root contrast injection were scanned with a fast, volume scanning, computed tomography scanner (DSR). A method was developed for the estimation of the myocardial perfusion territories of epicardial coronary arteries based on the cylindrical projection display of the three dimensional anatomy of the coronary arterial tree. The results in the postmortem studies demonstrated that the myocardial volume perfused by coronary artery branches, measured by DSR (V_{DSR}), correlated with the corresponding postmortem partitions (V_{pm}) ($V_{DSR}=0.93\ V_{pm}+0.29$, $r=0.99$ for dog; $V_{DSR}=1.05\ V_{pm}+0.02$, $r=0.99$ for pig 1; $V_{DSR}=1.01\ V_{pm}+0.065$, $r=0.99$ for pig 2; $V_{DSR}=1.06\ V_{pm}+0.4$, $r=0.99$ for in vivo).

These results suggest that a 3D CT scan of the opacified coronary arterial tree may provide the ability to predict the mass and location of the myocardial volume at risk in the intact subject.